We all age at a different speeds – and scientists have worked out how to calculate it

July 7 2015, by David Clancy

Credit: AI-generated image (disclaimer)

A study has confirmed what many of us have been saying for years: age is nothing but a number. The researchers developed a method to determine the pace of ageing in individuals by looking at a range of biomarkers – including blood pressure and gum health. The study participants, all aged 38, varied widely in "biological age" and those

ageing more quickly also looked older and reported more health problems.

The concept of biological age is often thought of as the proportion of an individual's ultimate lifespan that has elapsed. In the context of this study, however, its measurement and meaning are slightly different. Examining 954 men and women in the Dunedin Birth Study Cohort, the researchers determined the biological ages of the participants to years above or below 38, which gave a range from 28 years to 61 years.

The only definition of ageing that really works is based on populations rather than individuals. Ageing is an increase in the likelihood of dying with increasing chronological age, as shown in this table. That is one reason why this work is significant; because it gives an idea of ageing in an individual.

According to population measures, in the absence of any other information, two people aged 65 have an equal risk of dying in the coming year. If one is destined to die from an undiagnosed cancer within two years and the other lives to 95, which individual is older? This is one reason the search for biomarkers of ageing is important, but the authors of this study give yet another reason.

Studying age-related diseases vs studying ageing

Age is the major risk factor for more than 75% of the mortality suffered by those aged over 64 (based on UK ONS 2013 mortality data), including cancers, circulatory and respiratory illness and neurodegeneration. The traditional view is that each of these many conditions have their own particular causes. This view has driven much research – and funding.

However, the view of biogerontologists, who study the biology of ageing,

is that there are a few causes of ageing which substantially contribute to all of these age-related conditions. According to this view, if just a fraction of the billions spent on researching individual conditions were spent on finding and treating the basic causes of ageing, the payoffs could be huge, not least in terms of extended productive (tax-paying) lifespan and reduced healthcare costs.

This sort of basic research has been poorly funded in the past, but the logic of, and evidence for the biogerontologists' view is beginning to be understood. Treatments to delay the onset of ageing and hence extend healthy lifespan in a majority of the population are likely to be found in the next 20 years.

Ageing alogorithm

They may already be being tested in animal models in a lab somewhere. But because humans are so long-lived, we can't wait 40 or 50 years to see if it works. To test it in humans we need measures of biological age. To generate their estimates of biological age, the researchers used a previously described algorithm based on seven fairly common biomedical parameters.

They then produced a "pace of ageing" measure based on 18 parameters covering a range of organs and systems and known to change with age. Measures were taken at ages 26, 32 and 38. These included waist-hip ratio, lung and kidney function, blood pressure, cholesterol, even gum health. Study members with higher biological ages also showed a more rapid pace of ageing over the previous 12 years.

Study members with older biological ages and a faster pace of ageing looked older than others and reported more health problems. They also had poorer cognitive function, vascular health, grip strength, balance and motor ability.

Pace of ageing was scaled so that the mean was one year of physiological change per chronological year, with a range of 0-3 years of change per chronological year. It is frightening to think that the study member with a biological age of 61 may physiologically age 18 years within the next six chronological years, taking him (most likely a man, as men typically die earlier than women) to near his mean population life expectancy (around 80-years-old). According to the model this 38-year-old person may die within six or seven years.

Advances in anti-ageing therapies and in estimating biological age raise big questions for society, both at an individual level and in the public and private sectors. We should not be frightened of them, but we should start talking about these changes now, before they arrive.

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